

Claims

What is claimed is:

1. A method and apparatus for calibrating an optical disk tilt servo system of an optical disk drive, the optical disk drive capable of focusing a laser beam on an optical disk and receiving a reflection; the method comprising:
5 setting a standard location and at least two calibration locations, the standard location and the calibration locations corresponding to different parts of the optical disk;
10 calibrating a focusing condition of the optical disk in the optical disk drive for generating a corresponding focusing result in the standard location and the calibration locations;
 calculating different focusing results between each calibration
15 location and the standard location; according to the different focusing results, estimating corresponding tilt angles between the surface of the optical disk and the calibration locations; and
 determining whether tilt angles corresponding to the calibration
20 locations on the surface of the optical disk are equal.
2. The method of claim 1, wherein the optical disk drive further comprises a pick-up head for focusing the laser beam on the optical disk; the method further comprising:
 if the corresponding tilt angles of different calibration locations in
25 the surface are unequal, calculating a tilt compensation under a default physical model based on the corresponding tilt angle of each calibration location, adjusting the angle between the surface of the optical disk and a horizontal of the pick-up head according to the tilt compensation; wherein the physical model is that the
30 surface of the optical disk has different tilt angles at different locations.

3. The method of claim 2, wherein the physical model sets a linear relation between the tilt angles of the surface in different locations and distances between the locations.
- 5 4. The method of claim 2 further comprising: after adjusting the angle between the surface of the optical disk and the horizontal based on the tilt compensation, measuring the focusing result of the standard location in the optical disk drive for generating a standard focusing result.
- 10 5. The method of claim 4 further comprising:
after generating the standard focusing result, during data access of the optical disk in the optical disk drive, continuously adjusting the angle between the surface of the optical disk and the horizontal, so that the focusing result of the optical disk in the
15 optical disk drive is equal to the standard focusing result.
6. An optical disk drive comprising:
a pick-up head for focusing a laser beam on a optical disk and receiving a reflection signal;
20 a calibration module capable of setting a standard location and at least two calibration locations, each of the standard location and the calibration locations corresponding to different parts of the optical disk; the pick-up head capable of moving to the standard location and the calibration locations, and measuring focusing
25 conditions of the optical disk in the optical disk drive for generating a corresponding focusing result; and
a calculation module for calculating different focusing results between each calibration location and the standard location, and estimating corresponding tilt angles between the surface of the
30 optical disk and the calibration locations according to corresponding differences of each calibration location; the calculation module capable of determining whether the tilt angles

of the calibration locations on the surface of the optical disk are equal.

- 5 7. The optical disk drive of claim 6, wherein if the corresponding tilt angles of different calibration locations on the surface are unequal, the calculation module calculates a tilt compensation under a default physical model based on the corresponding tilt angle of each calibration location, wherein the physical model is that the surface of the optical disk has different tilt angles at different locations; the optical disk drive further comprising a tilt servo
10 system for adjusting the angle between the surface of the optical disk and a horizontal of the pick-up head according to the tilt compensation.
- 15 8. The optical disk drive of claim 7, wherein the physical model sets a linear relation between the tilt angles of the surface in different locations and distances between the locations.
- 20 9. The optical disk drive of claim 7, wherein after the tilt servo system adjusts the angle between the surface of the optical disk and the horizontal according to the tilt compensation, the calibration module measures the focusing result of the optical disk drive in the standard location for
25 generating a standard focusing result.
- 30 10. The optical disk drive of claim 9, wherein when the optical disk drive accesses data on the optical disk with the pick-up head, the tilt servo system adjusts the angle between the surface of the optical disk and the horizontal according to the standard focusing result, so that the focusing result of the optical disk in the optical disk drive is equal to the standard focusing result.